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THE PRESENT STATUS OF THE CATSKILL  
WATER SUPPLY FOR NEW YORK CITY.

BY

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## THE PRESENT STATUS OF THE CATSKILL WATER SUPPLY FOR NEW YORK CITY.

BY J. WALDO SMITH, CHIEF ENGINEER, BOARD OF WATER SUPPLY,  
NEW YORK CITY.

[Read September 7, 1915.]

Ten years ago it was my privilege to welcome the members of this Association to New York as they gathered for their annual convention some three months after the organization of the Board of Water Supply, when the engineering force numbered only twenty-five. Since that time the work has progressed to a maximum where the yearly expenditure was twenty-six million dollars, with an engineering force of about 1 320, and the time is now near when the city can utilize this great improvement. The maximum expended in any one month was \$3 900 000, and the maximum amount earned on any one contract in a month was \$473 000. The maximum amount earned on all contracts in a single year was \$19 500 000, and there have been six years when the earnings were in excess of \$10 000 000. The total expenditures to date are \$127 300 000, and obligations undertaken and nearly completed for \$8 300 000, or a total of \$135 600 000. No contract in a total of \$99 965 000 has been relet, and, so far as I can learn, no surety company has been called on to advance money. In order to furnish necessary data for the location of structures and the preparation of contracts, forty-six miles in depth of borings were made. The first construction contract for eleven miles of aqueduct was ready to advertise in October, 1906.

The present status of the work is:

The construction work of the Ashokan Reservoir is substantially completed, and there remain only grading and grassing, some highway and bridge work, the superstructures of the gate chambers and the aëration basin to be done. Water has been stored in the West Basin since September, 1913, and in the East Basin for about one year. Much water has been wasted during

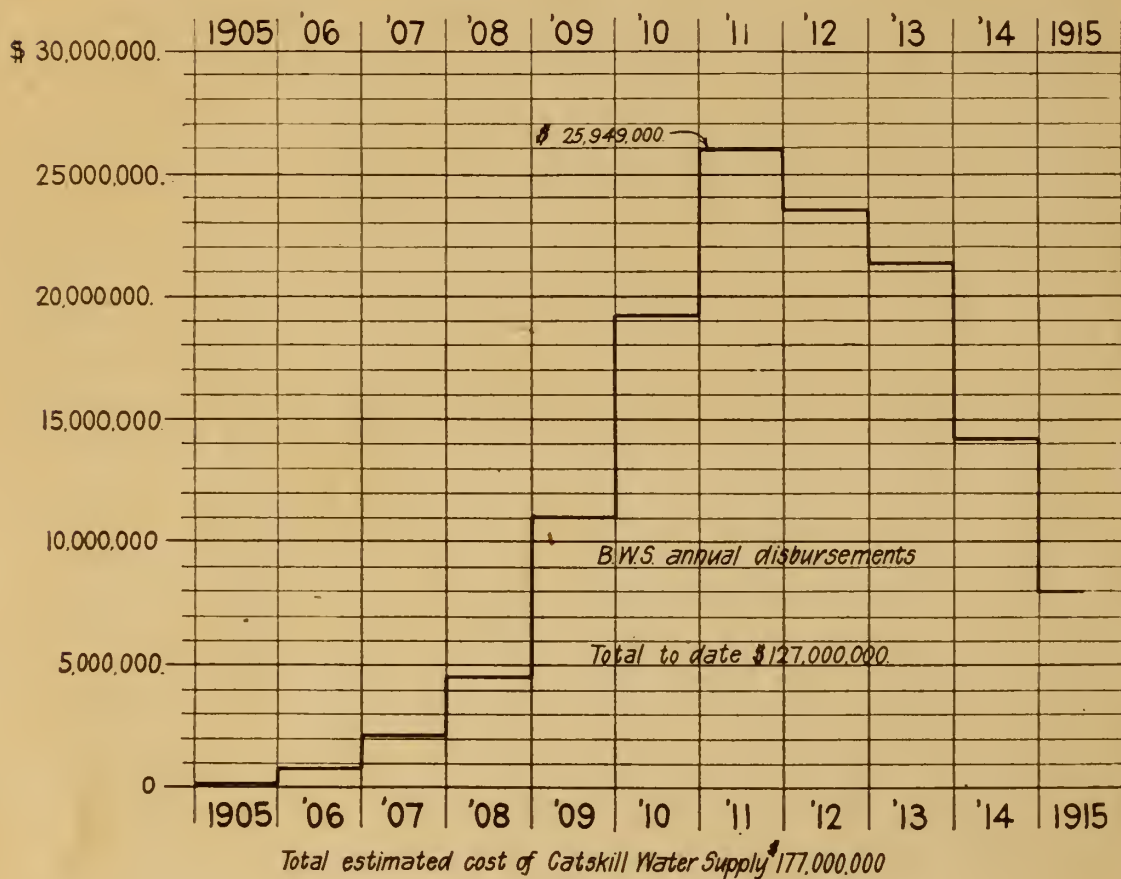


FIG. 1.

Diagram of the annual expenditures to date of the Board of Water Supply.

this year and there is still in store about 80 billion gallons of a total of 128 billion gallons. This reservoir will furnish a daily supply of not less than 250 million gallons, and investigations are now under way for other reservoirs to increase the capacity to not less than 600 million gallons per day. The capacity of this reservoir is over 20 per cent. greater than that of all the reservoirs in the Croton watershed. The construction work on the aqueduct, 92 miles long, will be completed in October, and more





FIG. 1.

The site of the Ashokan Dam as it existed ten years ago, the location of the dam being at the left of the picture, around the bend.



FIG. 2.

The Ashokan Dam as it exists to-day. This picture is taken very nearly from the same point as Fig. 1.



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than half of it has been carefully tested. Recent hydraulic experiments have disclosed that its capacity, making a reasonable allowance for loss due to growths which may accumulate in years of use, is about 600 million gallons per day. Recent measurements of leakage of two of the principal pressure tunnels, the Rondout and Wallkill, each  $4\frac{1}{2}$  miles long, showed for the Rondout, with 230 ft. unbalanced head or outward pressure, 70 gal. per minute, and for the Wallkill, with 150 ft. outward pressure, 32 gal. per minute. A preliminary test of  $3\frac{1}{2}$  miles of the city

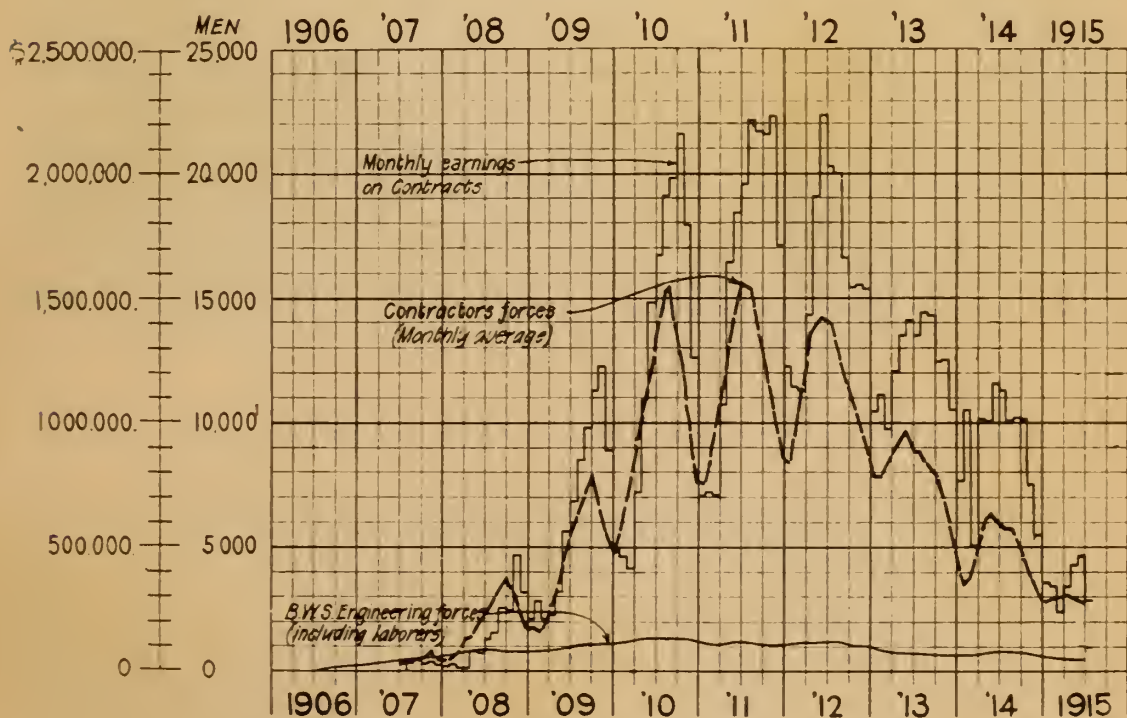


FIG. 2.

This diagram shows the maximum monthly earnings by contractors, reaching the maximum of about \$2 200 000 in 1911; the contractors' working force, reaching a maximum of about 17 000; and the engineering force, at the bottom, which reaches a maximum of about 1 325.

pressure tunnel between 93d Street and 25th Street, with 250 ft. outward pressure, showed a leakage of 90 gal. per minute, and if this follows the example of the other similar tunnels, will show a substantial reduction with time.

Construction work of the Kensico Reservoir will be so far completed at the end of the year that it may be entirely filled about four years ahead of the contract time.



The construction work of Hill View Reservoir, a small equalizing reservoir at the entrance of the city pressure tunnel, will be completed in October. The construction work of the city pressure tunnel, 18.1 miles long, the longest tunnel in the world, and varying in finished diameter from 15 to 11 ft., is nearing completion. The tunnel proper is completed, with the exception of tests. There remains, however, much detailed work in and at the top of shafts connecting it with the distribution system. The submerged pipe line across the Narrows promises completion by the end of the year, and the reservoir on Staten Island is in an advanced stage of construction.

For the 6.3 miles of steel pipe siphon, only one pipe has been laid; the other two will be added when the reservoir capacity is increased. Studies for a filtration plant are now under way, but, if built, this cannot be completed before 1920.

Since the Association met here in 1905, the work has progressed without misadventure or serious accident, so it is confidently expected that by January 1, 1916, it will be in the condition of a very large machine with very many working parts, which have just been assembled for the first time, and which has not been adjusted or tested. Some of the parts of the machine are necessarily of new and untried design to satisfy conditions never before met. And the problem that will then confront us on January 1, 1916, is the adjustment and test of this machine, the smoothing of the gears and bearings, the replacement or modification of the parts which do not properly perform their functions, the training of the operating force, the thorough adjustment and trial of the entire plant, and the tuning up and synchronizing of all the working parts, to the end that the operation may be safe, smooth, and continuous. It is believed that this may require all of the year 1916, although undoubtedly at times water from the Catskills will be delivered into the distribution system.

When it is considered that a considerable part of the total supply will be delivered directly into the pipes without any intervening reservoir and that a pumped supply of about 200 million gallons daily will be discontinued and the men laid off, it will be realized that everything in connection with the gravity supply





FIG. 1.

One of the bridges, this particular one being the Traver Hollow Bridge on Ashokan Reservoir road system.



FIG. 2.

Another bridge carrying a state highway across the Kensico Reservoir.



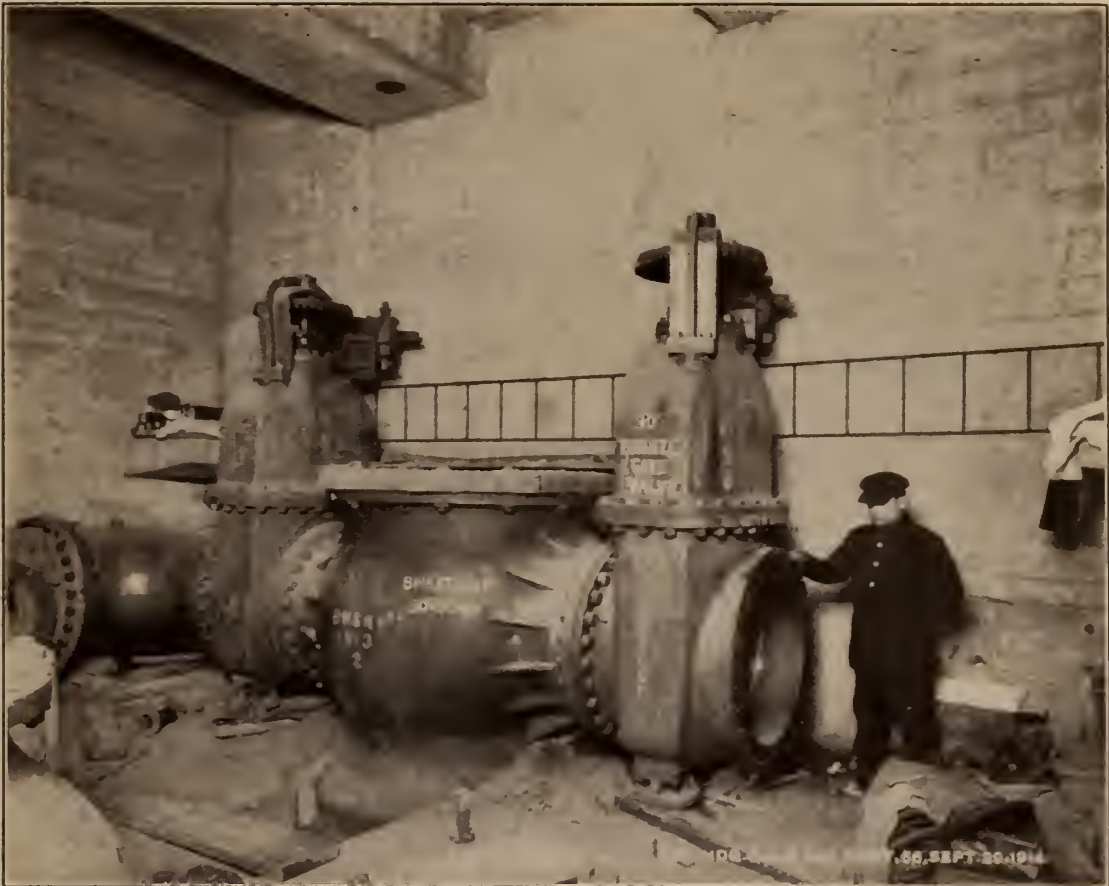


FIG. 1. This picture shows one of the risers which comes up through a shaft of the city tunnel, the view being of the inside of one of the chambers. The shaft cap and valves on either side are of solid bronze, and the cap is riveted directly to the riser pipe which comes up the shaft. On either side connections will be made to the distribution system.



FIG. 2. A completed siphon chamber. There is such a chamber at each end of each steel pipe siphon. In the distance you see the downstream chamber for the same siphon.





must be made as perfect and safe as possible, and that the estimated time of a year is none too long.

When the work is so far completed that water can safely and continuously be delivered to the distribution system, the maintenance and operation of that portion will devolve on and be directed by the Department of Water Supply.







